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THE GENUS *ARABIS* IN IOWA

CLARK D. PARIS

During the past year a critical study was made of the genus *Arabis* in Iowa. The specimens of the herbaria of Iowa State College at Ames, State University of Iowa at Iowa City, and Grinnell College at Grinnell were examined. Hopkins' recent paper "Arabis in Eastern and Central North America" was used in the identification of the plants.

No attempt has been made to monograph the Iowa *Arabis* previously. The only records are those that have been published in the various papers on the state flora, only a few of which are at all complete for the state as a whole. Green (2) listed 7 species, Cratty (1), 7 species, and Hopkins (3) cited 6 species and 2 varieties from Iowa. The present investigation found 8 species and 3 varieties. According to Hopkins (3) two of the Iowa species undergo nomenclatural changes. *A. pycnocarpa* Hopkins was described to include the plant formerly known as *A. hirsuta* (L.) Scop. and *A. brachycarpa* (T. & G.) Britton listed by Cratty and Greene is known now as *A. divaricarpa* Nelson.

In the following pages a key to the Iowa species is given as is also a brief description of them, and the citations of specimens examined. Specimens from the University of Iowa are indicated with a (U), those from Grinnell with a (G). All the others are in the herbarium of Iowa State College.

KEY TO THE IOWA SPECIES OF *ARABIS*

- a. Fruiting pedicels reflexed or pendulous; flowering pedicels at anthesis reflexed or at least somewhat descending; seeds winged all around.
 - 1. *A. canadensis*
- a. Fruiting pedicels erect, ascending or divaricately spreading, never pendulous. b
- b. Cauline leaves spatulate to linear, never amplexicaul or clasping; slender stems branching: radical leaves usually lyrate or pinnatifid. c
- b. Cauline leaves amplexicaul, clasping, or sagitate.
- c. Style usually less than 0.75 mm. long; stems and radical leaves quite glabrous 2b.....*A. lyrata* var. *glabra*
- c. Stem and (or) radical leaves somewhat pubescent. d
- d. Silique more than 2 cm. long.....2. *A. lyrata*
- d. Silique less than 2 cm. long.....2a. *A. lyrata* f. *parvisiliqua*
- e. Mature siliques terete, numerous.....3. *A. glabra*

- e. Mature siliques flat. f
 - f. Seeds in two rows. g
 - f. Seeds in only one row. h
 - g. Stem and leaves glabrous or rarely scantily pubescent, simple; flowers whitish to purplish.....4. *A. Drummondii*
 - g. Stem and cauline leaves usually pubescent; basal leaves stellately pubescent on both sides.....5. *A. divaricarpa*
 - h. Cauline leaves sessile with amplexicaul bases, irregularly dentate or more rarely sinuate, lanceolate to narrowly obovate, stellate pubescent beneath. i
 - h. Cauline leaves serrate dentate to entire, if dentate with only 1-2 (-4) teeth. j
 - i. Siliques finely and evenly stellate pubescent.....6. *A. dentata*
 - i. Siliques glabrous.....6a. *A. dentata* var. *phalacrocarpa*
 - j. Mature siliques divaricately spreading.....7. *A. laevigata*
 - j. Mature siliques erect or ascending. k
 - k. Pubescence of stem strictly appressed, predominately of bifurcate hairs.....8a. *A. pycnocarpa* var. *adpressipilis*
 - k. Pubescence of stem spreading or sub-spreading, predominantly of simple hairs. l
 - l. Cauline leaves more than 10; sepals herbaceous.....8. *A. pycnocarpa*
 - l. Cauline leaves 2-1- (-12); sepals membranaceous
- 8b. *A. pycnocarpa* var. *glabrata*

1. *A. canadensis* L.

Biennial: stem erect, 3-6 dm. high, usually simple, sparsely hirsute at base with usually simple hairs: basal leaves soon disappearing, obovate to lanceolate, serrate-dentate to slightly runcinate: cauline leaves imbricate to subremote, oblong-lanceolate to elliptic, sessile to subsessile, denticulate or more rarely subentire: siliques falcate to arcuate, recurved or pendulous.

SPECIMENS EXAMINED

Ft. Dodge, *Paige*; Fayette, June 5, 1894, *Fink*; North East Iowa, May 24, 1895, *Goddard*; North East Iowa, July 1, 1895, *Goddard*; Rocky Woods, Fayette, June 9, 1894, *Fink*; Lee Co., July, 1931, *Fults*; Eldora, June 5, 1924, *L. H., H. E. and L. Pammel*; Ft. Dodge, July 1, 1905, *Cratty*; Ledges, Boone Co., July 25, 1903, *Pammel, Buchanan, and King*; Estherville woods, Emmet Co., June 29, 1917, *Wolden*; Ledges, Boone Co., Sept. 13, 1902, *Buchanan*; Fayette, August, 1894, *Fink*; Woodman's Hollow, Webster Co., June 27, 1933, *Melhus*; McGregor, Clayton Co., August, 1933, *Melhus and Dietz*; Ledges, July 20, 1914, *Ellis*; Woods, Decatur Co., June 6, 1898, *Anderson*; Woods, Decatur Co., June 29, 1904, *Anderson*; Rowley, June 26, 1902, *Pammel*; Decorah, June 13, 1881, *Holway*; Ft. Dodge, Webster Co., July 5, 1897, *Shimek* (U); Allamakee Co., June 27, 1895, *Fitzpatrick* (U); Mt. Pleasant, *Mills* (U); Johnson Co., June 9, 1891, *Shimek* (U); Allamakee Co., June 26, 1895, *Fitzpatrick* (U); Hackberry Grove, Cerro Gordo Co., July 2, 1896, *Shimek* (U).

2. *A. lyrata* L.

Biennial (perennial southward): stem ascending 7-36 cm. high, more

or less slender, branching: radical leaves broad, spatulate to oblanceolate, most frequently lyrate-pinnatifid: cauline leaves spatulate to linear, lowermost often lyrate-pinnatifid, usually tapering to a sessile base: siliques 2-4 (4.5) cm. long, ascending or wide-spreading.

SPECIMENS EXAMINED

Decorah, July 13, 1881, *Holway*; North East Iowa, April 28, 1895, *Goddard*; Guttenberg, April 29, 1876, *Gmelin*; Ames, 1906, *Pammel*; Postville, July 8, 1904, *Pammel, Orr and Wilson*; Yellow River, Postville, 1905, *Pammel, Orr*; Decorah, June 2, 1876, *Holway*; Rocky Hills, Decorah, May 21, 1895, *Goddard*; Calcareous rock, Decorah Twp., June 2, 1933, *Tolstead*; Clinton Co., April 4, 1878, *Butler*.

2a. *A. lyrata* forma *parvisiliqua* Hopkins.

Siliques 1-2 cm. long. No specimens were found of this form, but Hopkins gives it as "throughout the range of the typical form of the species" hence it is included.

2b. *A. lyrata* var. *glabra* (DC.) Hopkins.

Stem and radical leaves quite glabrous or very rarely the petioles sparingly hirsute with a few scattered and simple hairs.

SPECIMENS EXAMINED

McGregor, May 30, 1918, *Pammel*; Calcareous rocks, 2 mi. north of Lansing, Allamakee Co., May 4, 1934, *Tolstead*; Decorah, June 2, 1876, *Holway*.

3. *A. glabra* (L.) Bernhardt.

Biennial: stem erect, tall, stout, usually simple below, 6-12 dm. high: basal leaves spatulate to oblanceolate, rarely lyrate-pinnatifid: cauline leaves lanceolate to elliptic-oblong, sessile with an amplexicaul sagittate or auriculate base: siliques terete, ascending, numerous.

SPECIMENS EXAMINED

Waterville, July, 1922, *Henrickson*; Johnson Co., *Linder* (U); Iowa City, *Hitchcock* (U).

4. *A. Drummondii* Gray.

Biennial: stem erect, 2-9 dm. high, glabrous to glaucous, basal leaves spatulate to oblanceolate, in a basal crown, tapering to a slender winged petiole: cauline leaves linear-lanceolate to lanceolate-oblong, imbricate to subremote, glabrous on both surfaces, sessile with a sagittate base; siliques normally flattish, seeds in two rows.

SPECIMENS EXAMINED

Clinton Co., May 26, 1878, *Butler*; Chickasaw Co., June 12, 1926, *Spiker*; Ames, 1903, *Pammel*; Fayette, 1894, *Fink*; Iowa City, *Hitchcock* (U); Johnson Co., May 7, 1895, *Shimek* (U); Fayette, about 1897, *Fellows* (U); Rocky banks, Johnson Co., May 3, 1891, *Shimek* (U); Johnson Co., May 15, 1895, *Fitzpatrick* (U); Winneshiek Co., June 14, 1895, *Fitzpatrick* (U); Johnson Co., May 14, 1895, *Fitzpatrick* (U); Johnson Co., May 7, 1895, *Shimek* (U); Iowa City, *Hitchcock* (U); Johnson Co., June, 1894, *Shimek* (U).

5. *A. divaricarpa*. Nelson.

Biennial: stem erect, 2-9 dm. high: radical leaves oblanceolate—spatulate to narrowly oblanceolate in basal rosettes, dentate to denticulate, finely and evenly pubescent on both surfaces with minute stellate hairs: cauline leaves narrowly oblong to linear-lanceolate, imbricate to subremote, erect or strongly ascending, sessile with an auriculate or sagittate base: siliques straight, suberect to widespreading, seeds in two rows.

SPECIMENS EXAMINED

Moingona, May, 1895, *Pammel*; North East Iowa, May 22, 1895, *Goddard*; Ames, 1895, *Carver*.

6. *A. dentata* (Torr.) T. & G.

Biennial: stem branching at the base, ascending, 2-6 dm. high: radical leaves spatulate or obovate to oblanceolate: cauline leaves oblanceolate to lanceolate or narrowly obovate, imbricate to subimbricate, sessile with an amplexicaul base, irregularly dentate or more rarely sinuate, acutish, siliques nearly straight, flattish, more or less finely stellate pubescent.

SPECIMENS EXAMINED

Sand mounds, south of Muscatine, Summer, 1935, *Estle and Brown*; Marshalltown, May 15, 1897, *Ball*; Ft. Dodge, *Paige*; Dolliver Park, June 6, 1932, *Melhus and Fults*; High Lake woods, Emmet Co., June 19, 1917, *Wolden*; High Lake "Long Island," Emmet Co., May 22, 1922, *Wolden*; Fayette, 1895, *Fink*; Clinton Co., May 4, 1878, *Butler*; Waterville, July, 1922, *Henrickson*; Fayette, 1894, *Fink*; Decorah, Winneshiek Co., May 29, 1899, *Savage* (U); Narrow wooded strip at Sand Mound, Muscatine Island, Muscatine Co., June, 1890, *Reppert* (U); Sandy alluvial flat, Muscatine Co., May 7, 1903, *Shimek* (U); Ames, *Hitchcock* (U); Ledge rock, Montour, June 7, 1923, *Conrad* (G).

6a. *A. dentata* var. *phalacrocarpa* Hopkins.

Siliques glabrous.

SPECIMENS EXAMINED

Armstrong, Emmet Co., July, 1900, *Cratty*; Eldora, May, 1921, (G).

7. *A. laevigata* (Muhl.) Poir.

Biennial: stem 3-9 dm. high, glabrous and strongly glaucous throughout, averaging 13-15 internodes to the first flower: basal leaves rosulate, soon disappearing; cauline leaves oblong-lanceolate to linear, spreading to subappressed, imbricate, sessile with a sagittate or sometimes auriculate base, serrate-dentate to entire: siliques irregularly downward curved to subarcuate-recurved spreading at maturity.

SPECIMENS EXAMINED

Decorah, Winneshiek Co., May 9, 1934, *Tolstead*; Pine Creek Hollow, Dubuque Co., June 18, 1922, *Pammel and Trenk*; Devil's Backbone, Dela-

ware Co., May 10, 1919, *Pammel*; Mahaska Co., July 18, 1919, *Pammel*; Muscatine Co., May 19, 1918, *Pammel*; Armstrong, July 3, 1902, *Pammel*; North East Iowa, June 1, 1895, *Goddard*.

8. *A. pycnocarpa* Hopkins.

Biennial: stem erect, 1.5-8 dm. high with spreading or subspreading pubescence: radical leaves oblong to oblanceolate, serrate-dentate to entire: cauline leaves oblong to linear-lanceolate, subremote to imbricate, irregularly dentate to entire, base sagittate to auriculate: siliques 3-5 cm. long, flattish, erect and adpressed.

SPECIMENS EXAMINED

Armstrong, *Paige*; High Lake Twp., Emmet Co., June 11, 1927, *Wolden*; Hardin Co., May 30, 1929, *Pammel*; Ames, June 3, 1897, *E. D. and E. R. Ball*; Winneshiek Co., June 16, 1899, *Goddard*; Iowa City, *Pammel*; Emmet Co., *Cratty* (U); 2 mi. north of Dillon on railroad bank, June 13, 1923, *Conard* (G).

8a. *A. pycnocarpa* var. *adpressipilis* Hopkins.

Stem pubescent with adpressed bifurcate hairs.

SPECIMENS EXAMINED

Estherville woods, Emmet Co., June 7, 1922, *Wolden*; Johnson Co., May 11, 1894, *Shimek* (U); Iowa City, *Hitchcock* (U); Johnson Co., June 6, 1891, *Shimek* (U); Cedar River region, Muscatine Co., May, 1894, *Reppert* (U); Jackson Co., Aug., 1894, *Shimek* (U); Johnson Co., Summer, 1888, *Linder* (U).

8b. *A. pycnocarpa* var. *glabrata* (T. and G.) Hopkins.

Mature siliques few; cauline leaves 2-10 (-12), remote to subremote: Upper part of stem glabrous. No specimens of this variety were found, but as Hopkins cites two specimens from southwestern Wisconsin, it may be found later.

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